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On auction equilibrium models with network applications

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Abstract

© 2015, Springer Science+Business Media New York. We consider a general auction market model with divisible commodities and price functions of participants and show that it can be suitable for proper description of complex systems with active elements. Using its equivalent variational inequality reformulation, we obtain a general existence result under mild additional conditions on price functions. We show that the basic network flow equilibrium problems are particular cases of this auction market model. Besides, we describe a new auction based model for resource allocation problems in wireless communication networks. This enables us to obtain new existence results for these models as simple adjustments of that for the general auction model.

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Keywords

Active elements, Auction models, Complex systems, Divisible commodities, Network flow equilibria, Price functions, Wireless communication networks